

WHAT IS CLAIMED IS :

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- 5 1. In a plasma film-forming apparatus which includes a film-forming chamber in which a substrate is arranged, a film-forming gas introducing pipe connected to a supply source of a film-forming gas at its first end, a shower plate through numerous holes of which a second end of said film-forming gas introducing pipe communicate with said film-forming chamber, film-gas exciting means for exciting film-forming gas introduced through said shower plate into said film-forming chamber, to form a film on the surface of said substrate with the chemical reaction, radicals-producing means which excites said cleaning gas and produces radicals, and cleaning-gas introducing means which introduces 10 said cleaning gas containing said free radicals into said film-forming chamber, the improvement in which said cleaning-gas introducing means communicate directly with said film-forming chamber.
- 15 2. A plasma film-forming apparatus according to claim 1, in which said cleaning-gas introducing means comprises a first cleaning-gas introducing pipe communicating with said film-forming chamber from one of the opposite walls, and a second cleaning-gas introducing pipe communicating with said film-forming chamber from the other of the opposite walls and said first and second cleaning-gas introducing pipes are shifted from the centers of said walls 20 in opposite directions.
3. A plasma film-forming apparatus according to claim 1 or 2 in which the inside surface of said cleaning-gas introducing means is coated with polytetra fluoro ethylene.
- 25 4. In a cleaning method of a plasma film-forming apparatus which, in the film-forming operation, introduces a film-forming gas through a shower plate having numerous holes into a film-forming chamber, excites the introduced gas and forms a film, with the chemical reaction, on a surface of substrate arranged in said film-forming chamber, and in the cleaning operation, introduces a cleaning-gas containing radicals produced by exciting of said cleaning-gas, into 30 said film-forming chamber and cleans said film-forming chamber by chemical

reaction of said radicals and removes materials to be cleaned, the improvement in which said cleaning gas containing said radicals is introduced directly into said film-forming chamber.

5. A cleaning method of a plasma film-forming chamber according to claim 4, in which, in said cleaning operation, inert gas is introduced into said film-forming chamber besides said cleaning gas containing radicals, said inert gas is excited to be inert ions, and said film-forming chamber is cleaned with the chemical reaction of said radicals and with the sputtering of said inert gas ions.

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